



Assessment of Nurses and Midwives Knowledge on the Prevention and Management of Pre-eclampsia and Eclampsia at the Buea Regional Hospital, Cameroon

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DOI: 10.31080/ASMS.2025.09.2122

Received: May 08, 2025

Published: July 25, 2025

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Abstract

Pre-eclampsia, is a pregnancy-related disorder marked by elevated blood pressure with diastolic pressure greater than or equal to 90 mmHg and proteinuria greater than or equal to 0.3g/24 hours after 20 weeks of gestation and can be found up to six weeks after child birth. Eclampsia is defined as generalized seizures often associated to or in addition to the criteria for pre-eclampsia where the seizures can be attributed or linked to other causes such as epilepsy. This condition remains a significant contributor to maternal and neonatal morbidity and mortality globally. This study evaluated the knowledge of nurses and midwives regarding the prevention and management of pre-eclampsia and eclampsia at the Buea Regional Hospital in Cameroon. A descriptive cross-sectional design was employed, using structured self-administered questionnaires distributed to 94 consenting nurses and midwives. Data were analyzed using SPSS version 23.0 and presented using descriptive statistics in tables and charts. The results showed that 81.9% of respondents had heard about pre-eclampsia and eclampsia, with 67.0% able to correctly define the conditions. Magnesium sulphate (36.3%) and antihypertensive medications (29.6%) such as Methyl dopa were commonly used treatments. Preventive strategies included regular blood pressure monitoring (93.6%), antenatal checks (96.8%), adequate rest (97.9%), hydration (90.4%), physical exercise (89.4%), and a protein-rich diet (78.7%). However, only 10.7% of respondents knew that magnesium sulphate is used for seizure prophylaxis during delivery. The most commonly used diagnostic tool was urinalysis (59.6%), with 33% recognizing the benefit of combining urinalysis and blood testing. The findings suggest that while there is a generally good level of awareness among nurses and midwives, gaps remain in comprehensive clinical knowledge, especially regarding pharmacological management. Strengthening continuous professional education and targeted training on pre-eclampsia and eclampsia is recommended to enhance maternal and neonatal care outcomes.

Keywords: Pre-Eclampsia; Eclampsia; Nurses' Knowledge; Prevention; Management; Buea; Cameroon

Introduction

Hypertensive disorders of pregnancy (HDP), particularly pre-eclampsia and eclampsia, remain significant public health concerns globally and are among the leading causes of maternal and perinatal morbidity and mortality. Pre-eclampsia is characterized by new-onset hypertension and proteinuria after 20 weeks of gestation in a previously normotensive woman, whereas eclampsia is the onset of generalized seizures in women with pre-eclampsia without any other attributable cause (American College of Obstetricians and Gynecologists [ACOG], WHO, 2023) [1]. These conditions can progress rapidly and unpredictably, often leading to life-threatening complications such as stroke, liver rupture, kidney failure, placental abruption, and fetal growth restriction (Moussa and Arian, 2014) [2].

Globally, hypertensive disorders complicate approximately 5–10% of all pregnancies, with pre-eclampsia affecting nearly 4.6% of pregnancies (Abalos, *et al.* 2013). Eclampsia, though less common, has severe consequences and is estimated to occur in 1 in 2000 deliveries in developed countries and as frequently as 1 in 100 in low-income regions (Khan, *et al.* 2006). In sub-Saharan Africa, these conditions account for a substantial proportion of maternal deaths due to late diagnosis, poor access to emergency obstetric care, and inadequate management at the primary healthcare level [3].

In Cameroon, maternal mortality remains unacceptably high, with hypertensive disorders being among the top three direct causes of maternal death (Ministry of Public Health Cameroon, 2021). According to the United Nations Population Fund (UNFPA), Cameroon recorded a maternal mortality ratio of approximately 467 deaths per 100,000 live births in 2020, with pre-eclampsia and eclampsia contributing significantly to these figures (UNFPA, 2021). The situation is exacerbated by systemic challenges, including shortage of trained personnel, lack of essential drugs like magnesium sulfate, limited monitoring equipment, and inconsistent clinical protocols (Nkafu, *et al.* 2019).

Nurses and midwives are on the frontline of maternal health services and play a critical role in the early detection and management of pre-eclampsia and eclampsia. Their responsibilities range from blood pressure monitoring and urine testing for albumin to administering antihypertensive medication and

initiating emergency care (Chigbu, *et al.* 2010). However, several studies in Africa have highlighted deficiencies in their knowledge and skills, with many practitioners failing to recognize warning signs or apply evidence-based management practices (Okafor, *et al.* 2015; Adekanle, *et al.* 2016).

Assessing and strengthening the knowledge base of nurses and midwives is essential to improving maternal outcomes. A knowledgeable healthcare workforce is better equipped to offer preventive counseling during antenatal care, detect high-risk cases early, and provide timely interventions to prevent progression to severe complications. Furthermore, continuous professional education and institutional support are vital for ensuring adherence to clinical guidelines and improving patient safety [4].

Given the burden of pre-eclampsia and eclampsia in Cameroon and the central role of nurses and midwives in maternal care, this study seeks to evaluate their knowledge regarding the prevention and management of these conditions at the Buea Regional Hospital. Findings from this study are expected to inform policy-makers, healthcare administrators, and training institutions on gaps in knowledge and opportunities for capacity-building.

Materials and Methods

Study area

The study was conducted at the Buea Regional Hospital, located in the capital of the South West Region of Cameroon. The hospital serves as a referral center for surrounding health districts and offers a broad range of medical services including internal medicine, surgery, pediatrics, obstetrics and gynecology, laboratory services, and specialized clinics such as diabetes and HIV/AIDS care. The maternity unit is one of the busiest departments, attending to hundreds of antenatal clients monthly. It includes antenatal care clinics, labor and delivery rooms, and postnatal care units. The hospital employs a multidisciplinary team including obstetricians, midwives, general nurses, and medical officers. Each department is managed by a ward charge under the supervision of the hospital director. Buea's location, characterized by semi-urban and rural surroundings, means the hospital receives a mixed patient population with varied socioeconomic and educational backgrounds, which directly influences healthcare delivery and patient outcomes.

Study design and duration

A descriptive hospital-based, cross-sectional study was carried out between February 23 and March 23, 2023. This design was selected to provide a snapshot of the knowledge levels among maternity nurses during a defined time period. A simple random sampling technique was used to eliminate bias. Participants were selected from duty rosters and invited to participate voluntarily.

Population and sampling

The study targeted nurses and midwives who had worked at the Buea regional Hospital for at least six months.

- **Inclusion criteria:** Nurses and midwives who had worked in the hospital for at least six months and who gave informed consent to participate.
- **Exclusion criteria:** Nurses and midwives on leave during the data collection period or those who declined to participate were excluded.

The Fisher's formula was used to determine the number of participants need to take part in this study.

Using the Fischer's formula the sample size was calculated as shown below;

$$n = \frac{Z^2 P(1-P)}{d^2}$$

Where Z = 1.96 (for 95% confidence),

p = 0.047; Prevalence of pre-eclampsia at the Buea Regional Hospital (Ngouakam., *et al.* 2021).

q = 1 - p = 0.953,

d = 0.05.

The calculated sample size was 68.8, approximated to about 69 participants.

To account for non-response, a 10% contingency was added, resulting in a final sample size of 94 participants.

Sampling technique

A purposive sampling technique was used to select participants who met the inclusion criteria. This non-probability method was deemed appropriate because the focus was on healthcare providers

directly involved in maternal care and considered knowledgeable in managing pre-eclampsia and eclampsia.

Data collection tools and procedure

Data were collected using a structured, self-administered questionnaire developed based on literature review and WHO/ACOG guidelines on the management of hypertensive disorders of pregnancy. The questionnaire comprised four sections; sociodemographic data (age, gender, professional qualification, and years of experience), knowledge of risk factors and signs of pre-eclampsia and eclampsia; knowledge of prevention and management practices and training history and access to guidelines.

The questionnaire was pre-tested among 10 nurses at a nearby district hospital to ensure clarity and reliability. Necessary modifications were made based on feedback received during the pilot. Content validity was established through expert review by two senior obstetricians and a public health specialist. Internal consistency of the knowledge section was evaluated using Cronbach's alpha, which yielded a value of 0.82, indicating good reliability.

Data management and analysis

Data were entered and analyzed using SPSS version 23.0. Descriptive statistics was used to determine proportions and results were presented on tables and figures.

Ethical considerations

Administrative clearance was obtained from Cornerstone University and Theological Seminar, Cameroon. Also, Approval was granted by the hospital management. All participants gave informed consent. Anonymity and confidentiality were maintained throughout and participant could opt out of the study if he or she felt uncomfortable. Since this study did not require the use of invasive procedures to collect blood, sputum, faeces and urine, an administrative clearance was enough.

Results

Socio-demographic characteristics of the study population

This current study considered 94 participants who were nurses (54.3%) and midwives (45.7%). From descriptive statistics, majority of the participants were between the age-group of 21-24 years (47.9%), and were females (88.3%). A majority of the nurses

and midwives had Higher National Diploma certification (56.4%) and had training on pre-eclampsia and eclampsia (43.6%). Most of them had worked for more than 4 years (72.3%) and were mostly state registered nurses (90.4%) (Table 1).

Variable	Category	Frequency (n)	Percentage (%)
Age group (years)	Less than 21	30	31.9
	21 to 24	45	47.9
	Greater than 25	19	20.2
Job description type	Nurse	51	54.3
	Midwife	43	45.7
Marital status	Single	30	31.9
	Married	64	68.1
Sex	Male	11	11.7
	Female	83	88.3
Educational level	Higher national Diploma	53	56.4
	Bachelor	20	21.3
	Masters or PhD	21	22.3
Relevant topic of training	Pre-eclampsia and eclampsia	41	43.6
	Nursing care	7	7.4
	Reproductive health	14	14.9
	Infection control	23	24.5
	Health information systems	9	9.6
Longevity of service	4 years and above	68	72.3
	Less than 4 years	26	27.7
Professional qualification	State registered nurse	85	90.4
	Nursing and midwifery assistant	4	4.3
	Others	5	5.3

Table 1: Socio-demographic characteristics of the nurses and midwives who enrolled in the study.

Knowledge on pre-eclampsia and eclampsia and its preventive methods amongst nurses and midwives at the Buea Regional Hospital

This study was also meant to determine the knowledge of nurses and midwives on the preventive methods against pre-eclampsia and eclampsia. The study found out that, only 81.9% of the participants heard about pre-eclampsia and eclampsia (Figure 1) and 67.0% could define pre-eclampsia and eclampsia as hypertension after 20 weeks of gestation and seizures during delivery (Figure 2). Statistical analysis revealed that Magnesium sulphate (36.3%) and antihypertensive drugs (29.6%) like methyl dopa were the most used pregnancy induced antihypertensive drugs respectively. Aspirin/Ibuprofen (1.1%) was the least of all the drugs used as pregnancy induced hypertensive medications being blood thinners which is an indicator for pre-eclampsia and eclampsia during pregnancy (Figure 3).

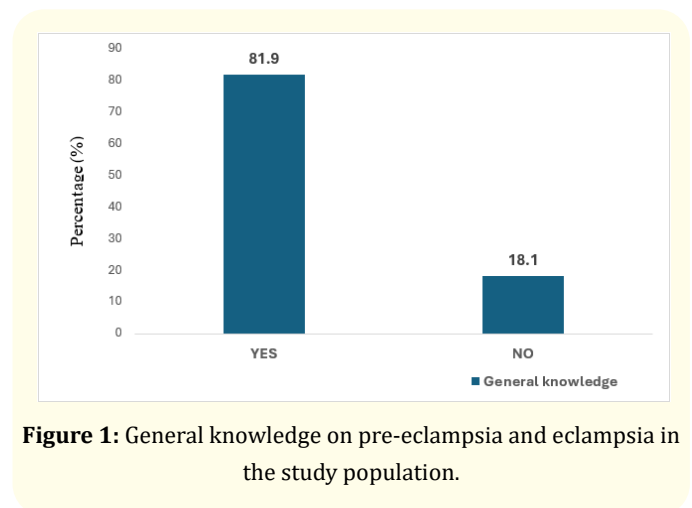


Figure 1: General knowledge on pre-eclampsia and eclampsia in the study population.

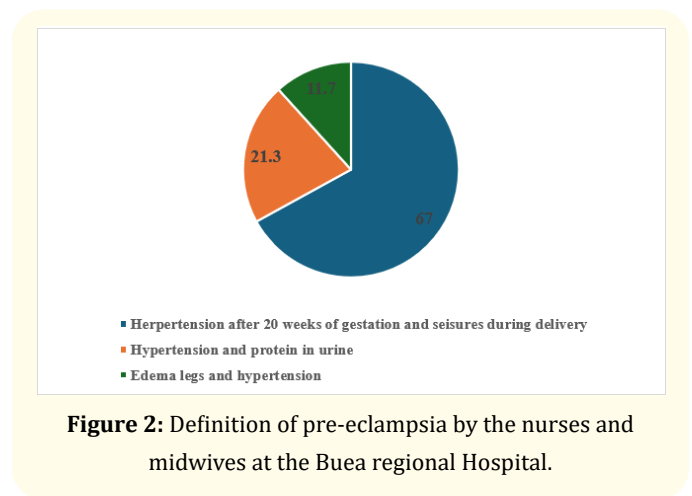


Figure 2: Definition of pre-eclampsia by the nurses and midwives at the Buea regional Hospital.

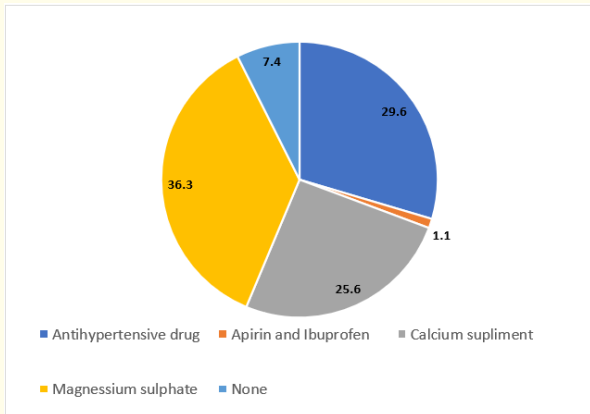


Figure 3: Medications used in preventing pre-eclampsia and eclampsia.

Table 2 presents the descriptive statistics of the preventive methods against pre-eclampsia and eclampsia in the study population. Statistical analysis revealed that measurement of arterial and systolic blood pressure (93.6%), constant measurement (76.6%) of pregnant women’s blood pressure and at ANC (96.8%), resting well (97.9%), doing exercises 89.4%), drinking enough water (90.4%) and eating protein rich food (78.7%) were preventive measures against the onset of pre-eclampsia and development of eclampsia during delivery. The use of a manual Bp machine to diagnose blood pressure was not considered to be tool for monitoring the onset of pre-eclampsia and development of eclampsia during delivery (45.7%).

Drink enough water	Yes	85	90.4
	No	9	9.6
Aviod eating salty food	Yes	80	85.1
	No	14	14.9
Eat protein rich food	Yes	74	78.7
	No	20	21.3

Table 2: Knowledge on the preventive methods against pre-eclampsia and eclampsia.

More as a preventive method of pre-eclampsia, urinalysis (59.6%) was the most used diagnostic test for proteinuria while the use of a blood test (1.1%) and the combined test of urinalysis and ultrasound (1.1%) were the least of all of the supplementary test used in monitoring maternal health against pre-eclampsia and eclampsia. Respondents also showed some promises in indicating that the combined use of urinalysis and blood test (33%) were a better way of diagnosing hypertension during pregnancy as an indicator for pre-eclampsia and eclampsia (Figure 4).

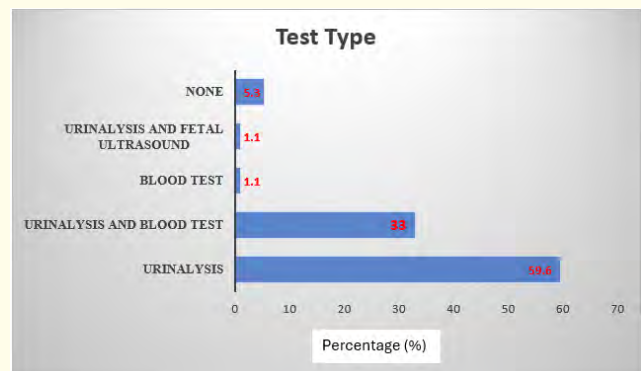


Figure 4: Supplementary tests used in monitoring symptoms of pre-eclampsia and eclampsia.

Knowledge on the management of pre-eclampsia and eclampsia by nurses and midwives at the Buea Regional Hospital

The study was also meant to evaluate healthcare practitioners on the knowledge of the management of pre-eclampsia and eclampsia. Respondents in the study indicated that, having a bed rest (28.7%) was the best method of management of pre-eclampsia and eclampsia which could help in reducing anxiety (reduce

Factor	Variable	Frequency	Percentage
Use of Manual BP equipment	Yes	43	45.7
	No	51	54.3
Use of automated BP machine	Yes	88	93.6
	No	6	6.4
Measure BP of pregnant women	Yes	72	76.6
	No	22	23.4
Measurement of BP at ANC	Yes	91	96.8
	No	3	3.2
Rest well	Yes	92	97.9
	No	2	2.1
Do exercise	Yes	84	89.4
	No	10	10.6

adrenaline secretion being a vasoconstrictor) followed by drinking enough water (14.9%), then elevating legs (13.8%) while sitting or sleeping. The least of all the management methods was eating protein rich foods (3.2%) followed by avoiding salty foods (7.4%) and avoiding stress (8.5%) (Figure 5). Also, the following methods were considered management methods of hypertension during pregnancy which is an indicator of Pre-eclampsia and eclampsia by nurses and midwives who took part in this study; supplementary test (94.7%), Initiating Rx treatment (76.6%) after being diagnosed positive, and giving patients magnesium sulphate during delivery (90.4%). Most participants did not accept that treatment of pre-eclampsia and eclampsia should start only after 37 weeks of gestation (57.4%) (Table 3).

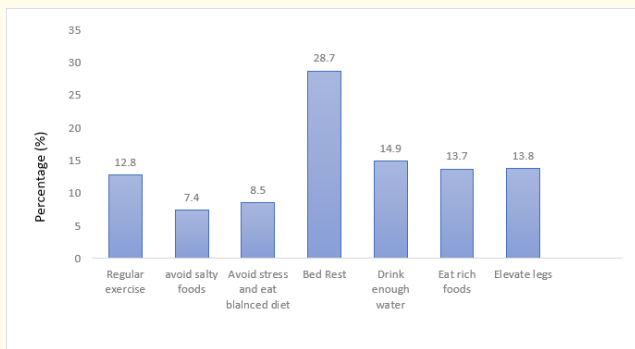


Figure 5: Management of pre-eclampsia and eclampsia during pregnancy.

Factors	Variable	Frequency (n)	Percentage (%)
Supplementary test	Yes	89	94.7
	No	5	5.3
Initiates Rx	Yes	72	76.6
	No	22	23.4
Treat preeclampsia after 37weeks	Yes	40	42.6
	No	54	57.4
Give patient magnesium sulfate	Yes	85	90.4
	NO	9	9.6

Table 3: Knowledge on the management methods of pre-eclampsia and eclampsia during pregnancy.

Discussion

This study evaluated the knowledge of nurses and midwives at the Buea Regional Hospital regarding the prevention and management of pre-eclampsia and eclampsia, a leading cause of maternal and perinatal morbidity and mortality worldwide. The results indicate that although a substantial proportion of nurses and midwives demonstrated general awareness of pre-eclampsia, there are notable gaps in specific knowledge areas essential for effective prevention and timely management.

Pre-eclampsia and eclampsia are significant public health challenges in sub-Saharan Africa, contributing to nearly 16% of maternal deaths annually [3]. Early recognition and appropriate management are critical, particularly in low-resource settings where advanced interventions may be limited. In our study, 81.9% of the nurses and midwives had heard about pre-eclampsia and eclampsia, with 67.0% correctly identifying it as hypertension after 20 weeks of gestation and seizures during delivery. This finding is in line with studies by Kumbani, *et al.* (2019) and Teymouri, *et al.* (2022), which reported similar awareness levels but highlighted persistent gaps in understanding diagnostic criteria and clinical implications. Similarly, a study in Ethiopia by Teshome, *et al.* (2020) found that 52.3% of healthcare workers had sufficient knowledge of hypertensive disorders in pregnancy, with knowledge significantly influenced by training and work experience. In our study, previous training with at least four years of experience had a higher proportion of participants reaffirming the importance of continuous professional education and experience as key sources of knowledge on pre-eclampsia and eclampsia.

The recognition of key signs and symptoms such as hypertension and proteinuria through regular testing of blood pressure and urinalysis respectively during antenatal care, was commendable and aligns with WHO (2011) guidelines that emphasize these as major diagnostic criteria for pre-eclampsia and impending eclampsia. However, knowledge of epigastric pain and edema as warning signs of severe pre-eclampsia and impending eclampsia [2] were not assessed. This gap in knowledge could contribute to delays in appropriate intervention, underscoring the need for targeted refresher training.

While most participants could identify common symptoms such as high blood pressure, proteinuria, and headaches, knowledge

on preventive strategies was limited. Only 25.6% of nurses and midwives recognized the importance of calcium supplementation, and even fewer acknowledged the use of low-dose aspirin in high-risk women. This is alarming given that the World Health Organization (WHO, 2011) recommends daily calcium supplementation (1.5–2.0 g) during pregnancy in areas with low dietary calcium intake and the initiation of low-dose aspirin (75–150 mg/day) before 16 weeks of gestation in women at high risk of pre-eclampsia and eclampsia. More so, most respondents attested that urinalysis is most preferred supplementary test to be used in the prevention of pre-eclampsia. This finding aligns with the policy of routine urinalysis diagnosis for proteinuria during ANC as means to monitor possibility of pre-eclampsia (ACOG, 2020).

International recommendations required the use of magnesium sulfate as the drug of choice for the management of eclampsia (WHO, 2011) [4]. But inadequate knowledge of pharmacologic and non-pharmacologic management options was observed. Only 29.6% of participants demonstrated appropriate knowledge of antihypertensive therapy, and less than half knew the correct use of magnesium sulfate for seizure prophylaxis. Previous studies have highlighted similar trends in other low- and middle-income countries, where a lack of continuous professional development undermines nurses' preparedness to handle obstetric emergencies (Onyeneho, *et al.* 2016; Lwanga, *et al.* 2020; Muriithi, *et al.* 2023). This further aligns with the findings by Katung, *et al.* (2021), who reported that while knowledge of magnesium sulfate use was high, practical understanding of its administration was inadequate in many low-resource settings. This shortfall could potentially lead to under-treatment or toxicity which signal a need for more hands-on training and clinical simulations.

In this study, the low proportion of nurses and midwives who had received formal training on pre-eclampsia and eclampsia management emphasizes the urgent need for targeted in-service training and continuing medical education. Evidence from Ethiopia and Ghana suggests that structured training programs significantly improve clinical competence, reduce delays in care, and enhance maternal outcomes (Ayalew, *et al.* 2021; Osei-Bonsu, *et al.* 2019). Moreover, institutional policies and protocols guiding pre-eclampsia care must be reinforced. A study by Ukah, *et al.* (2019) showed that the availability and use of standardized treatment protocols directly correlate with better health worker performance and lower rates of maternal complications.

Another concern was the potential impact of knowledge gaps on patient outcomes. Nurses and midwives are often the first point of contact for pregnant women in antenatal and delivery settings. Their ability to recognize early warning signs, initiate emergency measures, and refer appropriately can mean the difference between life and death. The observed deficiencies in this study suggest that without urgent interventions, maternal mortality linked to hypertensive disorders may persist. Lastly, while this study was also limited by its single-institution scope and reliance on self-reported knowledge, its findings provide a valuable basis for designing tailored interventions, including simulation-based training, periodic workshops, and integration of up-to-date guidelines in nursing and midwifery curricula [5-24].

Conclusion

This study assessed the knowledge of nurses and midwives on the prevention and management of pre-eclampsia and eclampsia at the Buea Regional Hospital. The findings revealed that while nurses and midwives are aware of the general concept of pre-eclampsia and eclampsia, significant knowledge gaps exist, particularly in the areas of evidence-based prevention strategies and clinical management protocols. These findings emphasize on the role of continuing education in equipping nurses and midwives with up-to-date knowledge and clinical skills in prevention and management of pre-eclampsia. The absence of structured in-service training and clinical supervision, as reported by study participants, reflects broader systemic challenges in maternal healthcare delivery, as similarly documented in other African contexts.

Recommendations

Based on the findings of this study, the following recommendations are proposed to improve nurses' knowledge and practices regarding the prevention/management of pre-eclampsia and eclampsia at the Buea Regional Hospital and similar settings:

- Institutionalize Continuous Professional Development (CPD). Regular knowledge refreshers will ensure that nurses are equipped with the latest evidence-based practices, ultimately leading to better patient outcomes.
- Develop and Disseminate Clinical Protocols and Guidelines. Clear, standardized guidelines on the prevention, diagnosis, and management of pre-eclampsia should be developed

based on WHO and ACOG recommendations. These should be displayed in all maternity units and included in nurses' manuals.

- Nurses and midwives should be trained to provide comprehensive patient education during ANC visits. This includes educating pregnant women on warning signs of pre-eclampsia and the importance of early medical consultation. Empowering pregnant women with knowledge will lead to earlier detection of symptoms and reduce maternal and fetal complications.

Acknowledgements

The authors appreciate the support and cooperation of all the nurses and midwives at the Buea Regional Hospital who participated in the study. We also appreciate the Cornerstone University and Theological Seminary, Cameroon for giving us the opportunity to carry out this project.

Administrative Authorization

Administrative authorizations were obtained from Cornerstone University and Theological Seminary, Cameroon and from the Regional Delegation of Public Health, of the South West Region of Cameroon (Ref.No. RII/MINSANTE/SWR/RDPH/PS/629/661). Authorization for collection of research data was also obtained from the Director of the Buea Regional Hospital. Every nurse or midwife who took part in this study, signed an informed concern form and participation was at their convenience. The participant had the right to opt out of the study at any time when she felt uncomfortable. All data collected was kept confidential and it was used only for the purpose of this research.

Competing Interests

The authors declare that they have no competing interests.

Author Contributions

AWC conceived, designed and provided major contributions and drafted manuscript, TBF participated in designing the projected and carried out data collection in the field. NLM, NES, and ALB contributed in the revision of the manuscript. MHF performed statistical analysis and participated in drafting the manuscript. All authors read and approved the final manuscript.

Funding

No special funding was received for this research.

Availability of Data and Materials

All datasets generated and analyzed during the study are presented in the paper.

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